

NON-PUBLIC?: N
ACCESSION #: 9405090073
LICENSEE EVENT REPORT (LER)

FACILITY NAME: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT 2 PAGE: 1
OF 4

DOCKET NUMBER: 05000261

TITLE: MANUAL REACTOR TRIP DUE TO ELECTRO - HYDRAULIC SYSTEM
OIL

LEAK

EVENT DATE: 04/03/94 LER #: 94-006-00 REPORT DATE: 05/03/94

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: K. R. Jury: Regulatory Affairs TELEPHONE: (803) 383-1363

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On April 3, 1994, H. B. Robinson Steam Electric Plant (HBRSEP), Unit 2 was operating at 100% power. At 2214 hours, the reactor was manually tripped during a load reduction that had been initiated at 2211 hours due to an electro-hydraulic (E-H) oil leak. The leakage, which originated from the #1 turbine governor valve (GV-1), resulted in automatic trips of the B-H oil pumps due to the low oil level in the oil reservoir. Prior to the trips of the E-H oil pumps, a manual load reduction had been initiated due to the leak. Once the pumps tripped, the governor valves started closing, which resulted in a rapid unanticipated load reduction. A manual reactor trip was initiated when the operators determined that an automatic reactor trip was imminent. The Unit was subsequently stabilized at hot shutdown. The leak was caused by a failed O-ring in the blank flange of GV-1 which had been installed during refueling outage

15 (RFO #15). An event evaluation determined the primary root cause of the O-ring failure to be incorrect installation of its associated blank flange.

This event is reported pursuant to 10 CFR 50.73(a)(2)(iv) as a condition that required a manual reactor trip.

END OF ABSTRACT

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I. DESCRIPTION OF EVENT

On April 3, 1994, at 2214 hours with H. B. Robinson Steam Electric Plant, Unit 2 (HBRSEP) operating at 100% power, a manual reactor trip was initiated upon recognition of the inability to recover from a loss of E-H oil (EHS Code: JJ). This event sequence started at 2205 hours, when the control room received a Turbine E-H Fluid Hi/Lo-Lo Level annunciator alarm. As a result, investigation into the cause of this alarm was initiated (i.e., the E-H Fluid Lo Level alarm, normally received first, was not received). At 2207 hours, a large leak was identified on the #1 turbine governor valve (i.e., GV-1). A turbine load reduction (i.e., approximately 5%/minute) was subsequently initiated in preparation for isolating the E-H oil supply to GV-1 (EHS Code: FCV). At 2211 hours, the E-H Fluid Reservoir Lo Level alarm was received; an E-H fluid lockout subsequently occurred, causing the E-H oil pumps to trip. At approximately the same time, the E-H Fluid System Hi/Lo Pressure alarm was received; the turbine governor valves began to drift closed from the loss of E-H oil pressure. The governor valves closing caused a rapid load reduction which would have caused a turbine trip (from governor valve closure) and a resultant reactor trip. This rapid load reduction also resulted in increasing Reactor Coolant System temperature and pressure which also would have caused an automatic reactor trip on over-temperature delta-temperature. A manual reactor trip was initiated at 2214 hours, based on an anticipated imminent automatic reactor trip.

II. CAUSE OF EVENT

This event was caused by improper blank flange assembly of the actuator for GV-1 valve. E-H oil was found leaking from the flange assembly at the lower sections of the actuator. During refueling outage #15 (RFO#15), a modification was implemented for the purpose of removing the Turbine Redundant Overspeed Trip System components (i.e., solenoids and piping) which had been previously electrically disabled and abandoned in place. This modification installed the subject blank flange and O-ring that failed. After the unit was stabilized at hot shutdown conditions, a

work request was initiated to remove the GV-1 blank flange and to inspect the O-ring. This flange was found to be mispositioned, such that the threads of one mounting bolt were visible between the flange and valve body. Upon flange disassembly, the O-ring appeared to be oversized and was discovered to have failed. Although not similarly mispositioned, the second flange mounted to the same valve was then disassembled and its O-ring was inspected. This O-ring was found to be intact; however it was longitudinally split on its outer diameter, and also appeared to be oversized. Both O-rings were replaced, as well as, all other E-H Control System turbine control valve O-rings installed by the modification.

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It was concluded that the primary root cause of the failed O-ring and mispositioned blank flange was incorrect installation. The flange mispositioned should have been detected during modification installation. This event was apparently caused by inattention to detail and lack of a questioning attitude by the installing craft, and lack of adequate supervision to ensure that contractors are working to expected standards.

While the O-rings initially appeared to be oversized, they were later determined to be the part number that was specified in the modification. The part number specified was the correct part for use in this application. Due to the damage the O-rings incurred, their actual respective specifications could not be positively determined.

III. ANALYSIS OF EVENT

The operational transient associated with this event began when a load reduction was manually initiated by control room operators due to a loss of E-H oil from GV-1. During this load reduction an E-H oil lockout occurred (i.e., due to the leak), causing the E-H oil pumps to trip. At approximately the same time, the turbine governor valves began to drift close due to the resultant loss of E-H oil pressure. The governor valves' closure resulted in an automatic load reduction at a rate greater than the operator-initiated manual load reduction. Although turbine load and reactor power were being manually reduced, the power reduction could not be accomplished quickly enough to prevent increasing reactor temperature and pressure. As a result, the reactor would have automatically tripped on over-temperature delta-temperature due to increasing reactor temperature and pressure. Manual action was taken to initiate a reactor trip in anticipation of the automatic reactor trip. In addition, with all four governor valves drifting closed, the operators recognized that a generator lockout/turbine trip/reactor trip would have occurred one minute after all four valves indicated closed on the RTGB. The reactor protection system functioned as expected; however two rod

bottom lights did not illuminate although the rods had fully inserted into the core. Operator action, in accordance with procedure, was taken to borate the reactor for the worth of the two rods. Additionally, the Turbine E-H Fluid Lo Level alarm did not annunciate as designed, which could have resulted in earlier detection of the E-H oil leak.

This event is reported pursuant to 10 CFR 50.73(a)(2)(iv) since this condition resulted in a manual reactor trip.

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IV. CORRECTIVE ACTIONS

Because of this failure, a decision was made to inspect and replace all of the remaining 26 O-rings. No other failed O-rings were identified.

Lessons learned from this LER will be reviewed with the new craft contractor prior to RFO #16. Craft Resources Unit Work Instruction INS 8-01, "Required Reviews of ACRs/CERs," will be revised to include this issue for future training purposes.

Individuals responsible for oversight of the improperly assembled valve have been counselled by their management.

The Turbine System Engineer will review Electro-Hydraulic Control System instrumentation for inclusion into the Preventive Maintenance Program.

V. ADDITIONAL INFORMATION

A. Failed Component Information

None

B. Previous Similar Events

None

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CP&L 10CFR50.73

Carolina Power & Light Company
Robinson Nuclear Plant
PO Box 790
Hartsville SC 29550

Robinson File No.: 13510C
Serial: RNP/94-0922

MAY 03 1994

United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/LICENSE NO. DPR-23
LICENSEE EVENT REPORT NO. 94-006-00

Gentlemen:

The enclosed Licensee Event Report (LER), is submitted in accordance with
10 CFR 50.73.

Very truly yours,

Marc P. Pearson
Plant General Manager

DTG:lst
Enclosure
c: Mr. S. D. Ebnetter, Administrator, US NRC, Region II
Mr. W. T. Orders, Senior Resident Inspector, HBRSEP
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*** END OF DOCUMENT ***
